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Engaging Adolescents to Care for Elderly Safety in the Community

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Abstract

In Hong Kong, a study of the trends and characteristics of accidents involving older persons was undertaken in a railway system. As part of a wider objective of engaging staff and students to help older persons to achieve safe and healthy journeys, a team of gerontologist and psychologists and their students was engaged to review accidents and incidents involving older persons and undertake research into possible underlying causes and mitigation measures. The aim of the study was to conduct a community project with older railway passengers to identify key factors related to accidents including physical environmental conditions.

Keywords: Physical environment; safety; accidents; elderly; Hong Kong

1. Introduction

Hong Kong is one of most rapidly demographically ageing societies in the world. The proportion of older persons is increasing and it is estimated that it will reach one-third of the total population by 2033 (UN Population Division, 2002). The proportion of the older population has continued to grow as a result of fertility decline and an increase in longevity (life expectancy). At the end of 2009, the population of

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elderly persons aged above 65 in Hong Kong was 13% (0.91 million people) of the total population of 7 million in Hong Kong (Census and Statistic Department, 2009). In the future, the proportion of the population aged 65 and over is projected to rise markedly from 12% in 2006 to 26% in 2036 (Hong Kong Planning Department, 2007). This means that, in less than 30 years, almost one out of every four people will be aged 65 and over. Actually, in 2015, almost one out of every four people will be aged 60 and over. The life expectancy at birth in 2009 for males was 79.8 years of age and for females was 86.1 (Census and Statistic Department, 2009). In Hong Kong, life expectancy is projected to reach 90 by 2050.

The population in the north-western New Territories has also undergone considerable numerical and compositional changes over the last decade or so. First, the total population in the Tuen Mun and Yuen Long Districts has increased almost 30%, growing from 804,733 in 1996 to 1,036,227 in 2006. Second, the percentage of elderly people aged over 65 or above has also been increasing. For example, in 2001, there were approximately 71,000 people aged 65+ living in the districts; by 2006, this number had increased to over 88,000. Based on statistical reports about projections of population in 2009-2018 (e.g., the Planning Department, HKSAR), the estimated number of the elderly population with the age of 65 or above in these districts will be 150,200 in the year 2018. In other words, there will be approximately 70% increase of this age group when compared to the year 2006.

There has been increasing number of injuries among older passengers in railway in the past two years. Most accidents occurred during alighting from railway carriages during non-peak hours, and involved incidents such as being nipped by the doors or tripping over the door sill. In translating theory into practice, the railway can contribute to a community perspective on healthy ageing by developing in the direction of a “community railway”, by engaging in programmes such as injury prevention, helping to create age-friendly community standards. The railway corporation can incorporate the social capital in the community, for example, by involving university, schools and elderly centres to engage local people to help older people to achieve safe journeys on the railway system.

2. Engaging adolescents to care for elderly safety

Lingnan University is a Liberal Arts University situated in Tuen Mun and hence the Department of Sociology and Social Policy is keen to engage colleagues and students to help older persons, and all passengers, to achieve safe and healthy journeys. Furthermore, the Department offers courses in Social Gerontology, Industrial and Organizational Psychology, Psychology Applied to Occupational Safety and Health, Environmental Psychology, Positive Psychology and Positive Living, and Human Development and Psychology of Adulthood. They are very relevant to this research topic. The Department was then invited to commit in the project with a group of undergraduate students. Most students in Lingnan University live in Tuen Mun and Yuen Long districts and they are frequent users of the railway. They are therefore very willing to participate in the project. We believe this is a kind of intergenerational interaction and support. Students will learn to care for the elderly, showing concern, giving help, emotional support, and safety knowledge transfer. At the same time, students will develop empathy and develop more awareness to the community they live in. To date, this is the first intergeneration study on elderly safety in a light rail system in Hong Kong.

3. Literature review on factors leading to outdoor falls among older adults

In a review by Phillips, Siu, Yeh and Cheng (2005), it was reported that elderly people injured in road accidents are three times more likely than younger people to die as a result of injury. Furthermore, falls are a leading cause of injury and death in people aged 65 or over in the USA and Australia (even at least once each year among 65 which is about 33% of this age group). Falls can result in prolonged

hospitalization, slow recovery, loss of mobility and loss of use of limbs, or even death from circulatory problems. Some accidents such as falls may lead to psychosocial impacts such as fear of falling, giving reduce quality of life, or some experience post-fall syndrome (loss of confidence, reluctance to attempt the activity causing the fall, etc.). Nevertheless, outdoor falls among older adults have been a neglected public health problem, and even less known about them in rural areas or in railway systems (Li, Keegan, Sternfeld, Sidney & Quesenberry, 2006).

In a study of 553 pedestrians' slips, trips and falls, Gallagher and & Scott (1997) reported that the majority (80%) of fall victims were females, and the average age was 65.27 years. Over one-third (35%, n=186) had some type of physical disability and many (n=106) reported using a mobility aide at the time of their accident. These findings suggest that older people, especially those with some mobility disabilities, are particularly vulnerable to trips and falls.

However, older people who suffered from falls outside of their residence tend to be healthier and physically more able than elderly people who experienced falls in their residential area (Li, Keegan, Sternfeld, Sidney & Quesenberry, 2006). Of the 2193 older and middle-aged adults studied, most outdoor falls (47.3%) happened during walking, and most outdoor falls (73%) were precipitated by environmental factors such as uneven surfaces and tripping or slipping on objects, and usually occurred on sidewalks, curbs and streets.

In another study, Shumway-Cook and colleagues (2002) proposed and tested eight factors (distance, temporal factors, ambient conditions, physical load, terrain, attentional demands, postural transitions and traffic density) that may affect older people's mobility. Apart from some obvious environmental factors such as ambient conditions (e.g., light level, weather condition) and terrain (such as the presence of stairs, slopes, uneven surfaces), special emphasis attention may need to be given to temporal factors and attentional demands factors.

For older adults walking around their communities, temporal constraints include not only the ability to cross a street in the time allotted by a traffic light or density of traffic, but also the need to maintain an appropriate speed of walking. Hence, walking in a crowded environment or among crowds that are moving at high speeds may increase the risk of falls.

Attentional demands factors refer to the ability to maintain balance while simultaneously walking and performing other tasks, which places demands on attentional aspects of balance control. Several studies have shown age-related declines in the ability to maintain stability under multi-task conditions in older adults, particularly those with balance impairments. Hence, a possible reason for falls is the visual and auditory distractions places demands on attentional aspects of balance control.

4. Theory and hypothesis

4.1. Safety attitudes of passengers

According to the theory of reasoned action, developed in the field of social psychology, Fishbein and Ajzen (1975) posited that individual behaviour is driven by behavioural intentions (see Fig. 1). Moreover, behavioural intentions depend upon the individual's attitude toward the behaviour and subjective norms (belief). The key concepts of the theory can be found in Table 1.

Fig. 1. Theory of reasoned action. Source: Fishbein & Ajzen, (1975)

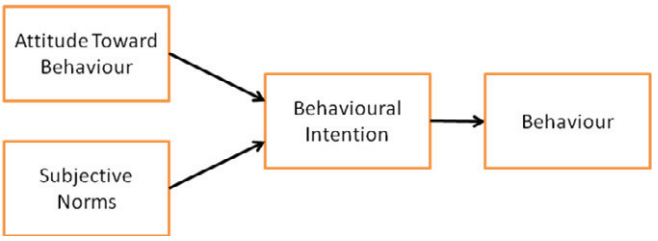

Table 1. Key concepts of the theory of reasoned action

Concepts	Definitions
Attitude Towards Behaviour	"An individual's positive or negative feelings about performing the target behaviour" (Fishbein & Ajzen, 1975, p. 216).
Subjective Norms	"The person's perception that most people who are important to him/her think he/she should or should not perform the behaviour in question" (Fishbein & Ajzen, 1975, p. 302).
(Source: Fishbein & Ajzen, 1975)	

Based on this theory and work by Siu and Cheung (1999), it is postulated that elderly passengers' safety attitudes may be conceptualized as:

Taken together, based on previous literatures, it is hypothesized that the factors related to falls amongst older users of the railway may include:

- Smoothness of the ride.
- The characteristics (age – young olds or old olds, gender, physical and psychological health condition, contrast and depth perception capability, attentional demand factors, temporal constraints factors, etc.) and safety attitudes (perception of instruction, feeling, and behaviour) of the elderly passengers.
- Internal design of compartment (such as ease of alighting, seating arrangement).
- Doors/windows (glare surface or opaque) of compartments.
- Physical conditions of platform (such as lighting, uneven surface).
- Characteristics of drivers involved in accidents (such as returning to work after a long holiday break, physical condition, safety attitudes, personality, etc.).
- Other factors (such as carrying of objects, weather) related to accidents, specifically falls during alighting.

5. Methodology

We adopted a four-stage study to triangulate the collected data in order to provide evidence of validity and reliability.

5.1. Sample and procedures

A total of 32 undergraduate students in Lingnan University mostly majored in sociology or psychology was recruited to participate in the project. They were briefed the objectives of the study, and trained basic skills in conducting field observations and face-to-face interviews. The four stages were as follows:

5.1.1. Stage 1: Content analysis of accident reports covering years 2005 – 2009

The Objectives were: to identify distinct characteristics of older persons who were involved in accidents; to investigate other general trend/patterns; and distinctive environmental characteristics associated with accidents. Accident reports were provided by a railway corporation.

5.1.2. Stage 2: Focus group study

The focus groups study was conducted in early March 2010 in an elderly activity center near one rail station, with 16 participants. All participants were females (aged between 71 years to 91 years) and all were from the surrounding areas of Tuen Mun and Yuen Long. Six elderly women were with motor movement difficulties. Each focus group discussion was conducted by one or two team members of the research project along with a student helper. Each session lasted for approximately 45 minutes. All discussions were tape-recorded and then transcribed (in Chinese).

5.1.3. Stage 3: Field study

The field observation study was conducted during one week in March in 2010. A total of six routes of rail were selected for the observations. 32 student helpers assigned to different routes during the timeslots 10:30-11:30, 12:30-13:30, 15:30-16:30 and 19:30-20:30. Observed areas included: characteristics of the older persons, boarding and alighting, & situations inside the train compartment, and etc. There were 753 observed cases.

5.1.4. Stage 4: Questionnaire survey

A total of 14 student helpers were recruited to conduct face-to-face interview survey with elderly passengers on trains or platforms. The study was completed during one week in June in 2010. In the end, a total of 325 older persons, with the mean age of 73.5, were interviewed. Questionnaire covered 5 main areas: general experience, experience of accidents, overall satisfaction and satisfaction on various aspects, rating on wheelchair facilities and suggestions for improvement of the railway system.

6. Results

Key findings from the four studies:

- There has been a slight increase in accidents among older persons in the past two years.
- The accidents involving older passengers tended to occur between 9am to noon since many of them needed to travel to a hospital.
- The major types of accidents are ‘lost balance and fell inside the train compartment’, ‘struck by the train doors’ and ‘stepped into the platform gap’.
- There may be under-reporting of accidents or near-miss accidents.
- The participants did not have a good knowledge of the rail routes, more than 20% had chosen a longer and/or indirect route that involved unnecessary change(s) of trains.
- Elderly passengers are in general satisfied with the rail services.
- The three aspects that received relatively low ratings were: train frequency, train seat availability, and elderly train seat arrangements.

- Wheelchair users were less satisfied with the wheelchair-users related facilities on the trains.
- Elderly passengers find more problems and dissatisfaction during alighting and boarding of trains.
- There is insufficient number of designated seats for the elderly.
- The availability of designated seats for the elderly was occupied by younger passengers.
- Quite a number of elderly passengers were not accompanied by family members/friends.

7. Discussion

The purpose of the study was to identify the key factors/reasons of accident proneness among elderly railway passengers. The four-stage study triangulated the collected data to enable comparison and support, and provided evidence of validity and reliability in the findings. The research team reached the following summary conclusions:

- Elderly passengers are in general satisfied with the rail services, yet wheelchair users were less satisfied with the wheelchair-users related facilities on the trains.
- The major types of accidents are 'lost balance and fell inside the train compartment'; 'struck by the train doors'; and 'stepped into the platform gap'.
- Elderly passengers find more problems and dissatisfaction during alighting and boarding of trains.
- In terms of seat availability, the main issue is insufficient number of designated seats for the elderly and the availability of such seats when occupied by younger travellers.
- Elderly passengers ask for more frequent services, in particular the route via a hospital.
- Quite a number of elderly passengers were unaccompanied by family members/friends.

To a certain extent, our findings corroborate previous studies conducted in Western societies. For instance, as noted by Gallagher and Scott (1997), we also found that older passengers in wheelchairs, and those with some mobility disabilities, tended to be more vulnerable to falls. Further, crowdedness, which was reported as a factor leading to falls by Shumway-Cook and colleagues (2002), was also noted. We found that elderly passengers boarding and alighting in crowded conditions were more prone to accidents.

7.1. Implications of findings

According to the safety attitude model, the railway corporation can impart more safety knowledge to elderly passengers (such as train route, alerting potential hazards, "Help Point" for reporting incident/accidents) so as to arouse their safety awareness, which in turn promote their safety intentions. In the end, safety behaviour of elderly passengers can be enhanced.

As indicated in this study, many older passengers were not accompanied during their journeys (almost 80% of older passengers being observed in Study 3 were travelling alone). They might encounter difficulties when boarding or alighting to the train, especially during their peak travel hours (9am to 12noon). Therefore, we recommend that the rail corporation considers employing platform assistants in certain platforms to help passengers, especially older passengers and all passengers with special needs (such as those with wheelchairs, or with sight difficulties) during peak hours. Moreover, adolescents in the community should take a more proactive role to assist elderly passengers.

We also recommend the railway corporation to investigate the possibility of improving platform designs and/or visibility of the gaps. For example, clearer and larger signs (e.g., sharp colour distinction and wider band for the edge line on the platform floor) could be used to show that the platform gap is ahead. Announcements can also be used to warn the passengers on the platform gap.

However, we caution against excessive use of noise and announcements. There is already information and environmental "noise overload" on some means of transport locally. Older people are more likely to have hearing problems and some forms of hearing loss (low, mid or high range) and some use hearing

aids. For such passengers, background noise and announcements can be very annoying and distracting and hence even potentially dangerous.

Some accidents observed in our studies involved passengers being trapped by the train doors or losing balance and falling in the train compartments. We therefore suggest several recommendations to minimize the future occurrence of similar accidents.

As reported in both Study 2 (Focus Group Discussion) and Study 3 (Field Observation), passengers might encounter difficulties in boarding or aligning from trains. For example, in Study 3, slightly over 20% of older passengers encountered problems when getting onboard/alighting from trains. With the majority of older passengers (and also passengers with motor problems), an issue was speed of alighting from the train after the train had stopped or after the train doors were open. Therefore, elderly passengers may need more time to alight from the carriage, especially when the train is crowded in peak hours. Therefore, we recommend the railway corporation should prolong the time for passengers to board or alight. Perhaps door closing speed can be slower. Finally, mirrors or monitors can be provided near the train doors to ensure that passengers have successfully boarded or alighted before closing the doors.

Findings from research tend to reveal that older passengers may have more problems in identifying their destined locations. Therefore, provision of information should be useful for older passengers to better prepare themselves to leave the train compartment. In the current design, visual information of the name of the upcoming station is only provided at the display panel at the front of the compartment, we suggest showing this piece of information on both sides of the train compartment, in as large a print size as possible. Again, adolescents in the community should assist elderly passengers on voluntary basis.

In Study 4 (Questionnaire Survey), the results showed that older passengers were least satisfied with the seats arrangement for the elderly. Older passengers without seats may lose their balance and fall in the train compartment. One recommendation is to provide priority seats for the older passengers and enforce regulations on giving up seats to those who are in need. The rail corporation can designate seats which are close to the train doors as priority seats for older passengers. Different colours or signs, preferably via symbols, can be used to indicate that the destined seats are encouraged for use by older passengers or passengers with special needs. Education programmes for passengers especially the youngsters should be launched in order to raise their awareness of the priority seat arrangements. It is suggested that volunteers, particularly secondary school students and university students from the districts of Tuen Mun and Yuen Long can be recruited as ambassadors to promote the need to give up seats, especially the designated priority seats, to older passengers or those with needs.

Furthermore, if stops' structures cannot be reconstructed to improve safety features due to space constraints, the rail corporation may want to consider launching educational programs to teach elderly users, specifically to educate elderly passengers preventive behaviours/measures to learn how to get through the crowds, not to rush, how to queue up, how to walk up and down in stairs and on platforms, boarding and alighting, etc. The STEPS Project in Canada can be a good example (Gallagher, 1997). Another recommendation is to set aside designated waiting area for elderly passengers.

At the end of the project, students who participated in any of the four stages of the study were asked to write reflections. They are summarized as follows:

- Lighting is not enough at station; it was quite dim even during the day.
- More handrails on the ramps/stairs leading to platforms to aid safety.
- More benches on the platforms (may conflict with space constraints mentioned previously).
- During rush hours, there were too many passengers boarding and alighting, the ramp/stairs and platforms are not wide enough for so many people. Elderly passengers might be bumped or pushed during that time.
- Portable ramps for covering the platform gap should be introduced to help wheelchair users get on the train.

- Staff should be assigned at stations where more elderly use to assist them for boarding and alighting.
- More education and promotion on giving up seats for elderly are needed
- Should pay more attention on the platform gap width
- More attention to the temperature inside the train. For instance, the temperature in the train compartment is not ideal – too hot when the train is busy and too cold when it is quiet.
- Elderly people felt that asking for assistance is useless.
- Many people carried bulky luggage and baby strollers onto the train. This can be a potential cause of injury.
- Increase train frequency, especially during rush hours and on some routes which elderly passengers mostly use.
- Anti-slip carpets/flooring can be used inside the trains, near the train door, to prevent slips and falls.

8. Conclusion

These results obtained from the four stages of the study to a certain extent corroborate observations and reflections reported by the students involved in the study. It is hoped that the findings will be of both specific and general use in mitigating incidents involving older people in railway systems, contributing to an age-friendly city environment. It can be concluded that such intergenerational action research is beneficial to both adolescents and older persons in the community. Adolescents show more awareness and concern for elderly safety in the community. As part of the community in Tuen Mun and Yuen Long districts, Lingnan University is keen to continue to engage our students to educate light rail safety and "good behaviour" to secondary school students, and to work with secondary school students to help educate older passengers about information, intention and safety behaviour when travelling on the railway.

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